

### Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

### Listing of Claims:

Claim 1 (currently amended) 1. An algebraic codebook method for distributions of  $P$  signed pulses on  $N$  positions in speech encoding, comprising:

(a) indexing all distributions of  $P$  signed pulses on  $N$  positions by ordering said distributions in terms of numbers of distributions of  $Q$  pulses on  $M$  positions for  $Q$  less than  $P$ ,  $M$  less than or equal to  $N$ , and without regard to the sign of any pulses at the  $M$ th position, where  $P$ ,  $N$ ,  $Q$ , and  $M$  are non-negative integers; and  
(b) using said indexing to provide an index to encode an excitation for an input speech frame with said excitation including a distribution of  $P$  signed pulses on  $N$  positions.

Claim 2 (original) The method of claim 1 wherein:

(a) each of said  $N$  positions containing at least one of said  $P$  pulses corresponds to said numbers of distributions of  $Q$  pulses on  $M$  positions for a single value of  $Q$ .

Claim 3 (currently amended) An algebraic codebook method for distributions of  $P$  signed pulses on  $N$  positions in speech encoding, comprising:

(a) providing an excitation for an input speech frame with said excitation including a distribution of  $P$  signed pulses on  $N$  positions; and  
(b) computing a codebook index for a said distribution of  $P$  signed pulses on  $N$  positions by summing a pulse index for each non-overlapping pulse with each said pulse index a sum of terms  $XK(M,Q)$  where  $X$  is a multiplier equal to 0, 1, or 2 and  $K(M,Q)$  is the numbers of distributions of  $Q$  signed pulses on  $M$  positions

without regard to the sign of any pulses at the  $M$ th position, where  $P$ ,  $N$ ,  $Q$ , and  $M$  are non-negative integers; and

(c) using said codebook index as part of an encoding of said speech frame.

Claim 4 (currently amended) An algebraic codebook method for distributions of  $P$  signed pulses on  $N$  positions in speech decoding, comprising:

(a) providing an input encoded frame of speech with encoded excitation including a codebook index  $I_{CB}$  where  $I_{CB}$  is a sum of one or more pulse indexes with each pulse index corresponding to a position occupied by one or more pulses of a distribution of  $P$  signed pulses on  $N$  positions, wherein each pulse index is a sum with respect to  $M$  of one or more terms  $XK(M,Q)$  where  $X$  is a multiplier equal to 0, 1, or 2 and  $K(M,Q)$  is the number of distributions of  $Q$  signed pulses on  $M$  positions without regard to the sign of any pulses at the  $M$ th position, and wherein  $P$ ,  $N$ ,  $Q$ , and  $M$  are non-negative integers;

(b) computing a distribution of  $P$  signed pulses on  $N$  positions from said codebook index  $I_{CB}$  by successively extracting each of said pulse indexes from  $I_{CB}$  where a pulse index is computed by accumulating  $XK(M,Q)$  for  $M$  decreasing from a location determined by the extraction of the immediately prior pulse index, said accumulating continuing until equaling or exceeding  $I_{CB}$  minus the prior extracted pulse indexes; and

(c) using said distribution of  $P$  signed pulses as part of an excitation in synthesizing a speech frame corresponding to said input frame.